Capacity Market Reform

This template is being provided in addition to the options matrix to help stakeholders provide their high-level design concepts in context with all Key Work Activities. This may cover all or parts of the RASTF key work activities and seasonal capacity and should focus on design objectives and solution options. We are still in the solution options phase of CBIR. Therefore, this should not be proposals or packages at this time.

Concept Overview -- NRDC, Sierra Club, and RMI

A high-level summary to add context needed to help stakeholders understand your high-level design concept.
At the highest level, our concept is to keep the basic framework capacity market but make major changes to more accurately allocate risk and ensure that load can be served. 1. **ELCC for all.** The capacity market was designed to transact capacity from resources that were assumed to be subject only to random, uncorrelated outages. Supply unavailability is increasingly correlated, meaning the assumption that procuring enough capacity to cover peak load plus a reserve margin will guarantee resource adequacy is wrong. Correlated unavailability means that outages can happen during off-peak hours, and that planners need to consider the availability of a resource given (1) weather, (2) all other resources on the system, and (3) load, which is increasingly dynamic, when determining the resource adequacy or capacity value of said resource. We propose systematic application of ELCC or similar methodology for capacity accreditation, along with corresponding changes to resource obligations. As this approach should eliminate unmanageable risk for storage and renewables, this will allow reexamining the exception from capacity market must-offer requirements for those resource types. 2. **Seasonal Market.** PJM supply, demand, and constraints vary by season. RPM was designed around the assumption that only summer peak hours are meaningful for resource adequacy. Capacity Performance has aimed to address resource adequacy concerns that winter and other non-peak times present, but we believe CP contains significant flaws. Notably, using a single annual product to serve multiple seasons demands a "worst of both worlds" approach, where resources must be valued based on their lowest performing season, but capacity requirements set to meet the season with highest needs. Additionally, RPM inefficiently allocates risk across the year and fails to take advantage of seasonal variations in transmission capability. We believe a seasonal market could remove these inefficiencies and better align capacity commitments with system needs; therefore, propose that PJM stakeholders should develop and evaluate detailed seasonal market designs for possible adoption.
How does your concept address reliability needs? The basic approach remains the same: procure sufficient capacity commitments to ensure the system meets resource adequacy standards. We believe our approach will improve reliability outcomes for two main reasons:

1. **More Rigorous Accreditation**. Capacity accreditation for most resources currently overlooks many risk factors. Our approach embraces the dynamic and variable nature inherent to the supply mix (and likely to increase given market and policy trajectories). We propose to transfer risks inherent to supply back to supply and away from load, and hold resources accountable for performance consistent with how their capacity is accredited. Additionally, ELCC provides a framework that can much more easily incorporate new risks into capacity accreditation, giving PJM a systematic and fair way to adapt to change.
2. **Explicit Consideration of Winter Reliability**. RPM currently relies on capacity procured to meet the summer peak being sufficient to also serve winter loads. As part of considering a seasonal market, we propose explicit modeling of winter capacity needs (through a seasonal UCAP requirement) and winter supply issues (through seasonal ELCC). We believe this will put PJM in a much better position to manage winter resource adequacy, and especially to consider fuel security issues.

How do you frame the definition of a capacity product in your concept?

The current capacity product is a not-always-consistent mix of risk-adjusted expected output and an obligation to deliver energy. We propose replacing this with a single, consistent definition that applies to all resource types: The capacity product is an obligation (by sellers) and expectation (by consumers) that capacity resources will be available consistent with an ELCC-category-specific set of performance assumptions. These assumptions are converted to a fungible UCAP value. UCAP is defined as the resource adequacy contribution of a perfect supply resource, and all capacity resources are expressed in UCAP terms. This means that the UCAP of any resource will be a function not only of that resource's individual characteristics, but of load shape and other resources in PJM's fleet. With this approach, the accreditation, obligations, and payment for capacity resources are all based on a consistent metric.

Key Work Activity 2 - Reliability Risk and Risk Drivers

Determine the types of reliability risks and risk drivers to be considered by the capacity market and how they should be accounted for.

Component 1	Component 2	Component 3
Allocate under-management-control generation risks to the supply resource.	Enhance RA models to better account for extreme weather events, including winter risk.	Eliminate incentives for fuel-risk arbitrage
Requirements for Option	Requirements for Option	
Adopt ELCC for all resources. In addition to the 'standard' ELCC factors, for resources identified as fuel-insecure, this includes risk of fuel outages. For all resources, this includes any applicable deration due to hot or cold weather (i.e. ambient derates).Those risks should be removed from the IRM target. Uncorrelated outages should not be included in ELCC, but should remain in eFORd and remain the responsibility of the supply resource.	Pending further guidance or requirements from FERC regarding planning for extreme weather, develop extreme weather scenarios and incorporate into both load and supply modeling. Winter supply risks should be reflected in ELCC as discussed in Component 1. Ensure that internal transmission capability (i.e., CETO and CETL) is appropriately modeled.	Currently, thermal units enjoy capacity payments as year-round resources even if they don't have secure fuel supply. History (polar vortex and Uri) suggest that low-probability risks or windfalls do not discipline market behavior. This creates a winter risk from resources who bet on no emergency happening. Require resources to either demonstrate firm fuel or accept a discounted UCAP reflecting their lower risks.

Key Work Activity 3 - Procurement Metric and Level

Determine the desired procurement metric and level to maintain the desired level of reliability.

Component 1	Component 2	Component 3
Use expected unserved energy to ensure that the magnitude and duration of outage events is categorized	Separate, co-optimized seasonal procurement targets.	Consider deferring part of capacity procurement to manage load forecast risks. (e.g., reintroduce the short-term resource procurement target)
Requirements for Option	Requirements for Option	Requirements for Option
We think this is separable from other activities. To the extent that determining acceptable EUE requires value judgments about when an outage occurs or who is affected, solicit input from state regulators, as key partners in determining acceptable risk levels.	As part of studying seasonal markets, evaluate setting separate target UCAP levels for each season. Also evaluate the potential benefits and implementation difficulty of dynamically allocating EUE (or whatever the final "bad stuff" metric is) across seasons, subject to annual constraints.	

Key Work Activity 4 – Performance Assessment

Determine the performance expected from a capacity resource.

Component 1
Resources should be obligated to perform to the assumptions used to calculate their UCAP value. That UCAP value will reflect class-level assumptions captured in the ELCC method as well as unit-specific adjustments. Risks that are already reflected in their ELCC discount from nameplate do not result in penalties (other than if the owner fails to follow Good Utility Practice, is negligent or deceptive, etc.). However, risks that are already reflected in the unit-specific adjustment lie on the resource.
Requirements for Option
For thermal resources: failing to deliver due to risks considered in the ELCC will not result in penalties. Ideally, those risks will be tied to specific GADS outage codes. Fuel-related outages will incur penalties for resources treated as fuel-secure. For intermittent: variable output due to weather/sun conditions will not result in penalties. Output below what the resource is modeled as producing during prevailing weather conditions will result in penalties. Outages due to non-weather reasons within management control will result in penalties. For storage: obligated to make the MWh corresponding to their ELCC class and the MW used to determine their ELCC available to PJM for dispatch. For all resource types: outages corresponding to the non-correlated eFORd rate result in penalties.

Key Work Activity 5 – Qualification and Accreditation

Determine the qualification and accreditation of capacity resources.

Option 1	Option 2
Apply ELCC to all resources, and then individual unit-specific performance.	Reflect scheduled maintenance/planned outages in capacity accreditation or require resources to procure replacement capacity to cover these outages.
Requirements for Option	Requirements for Option
1. Adjust IRM downward to reflect shifting of supply risks back to supply. 2. Adjust IRM downward to reflect that, as reliability hours change with an evolving resource mix, so too might the level of marginal UCAP needed to maintain reliability targets. 3. Retain unit-specific performance adjustments to ELCC for resources where maintenance and fuel procurement significantly impact capacity rating. If stakeholders decide on marginal ELCC, UCAP target must be adjusted to account for the fact that, while individual unit accreditation may be less, the reliability of the fleet is unchanged (an accounting change does not make a system less reliable), and therefore retaining the existing UCAP target would lead to over-procurement. Additional factors to consider with marginal ELCC: 1. Determine (or clarify) a method for allocating IRM reductions. Allocation should reflect physical grid conditions (e.g., local load, transmission constraints). Where appropriate, method should seek to allocate IRM reductions to the customers who are paying for a resource mix that enables a reduced IRM (e.g., IRM reductions resulting from VA solar under marginal ELCC should be allocated to VA customers.)	If PJM adopts a seasonal market construct it will be important to send proper price and reliability signals for capacity in shoulder seasons. If PJM adopts a seasonal market that includes a shoulder season, consider eliminating the performance exemptions for planned outages. Resources who wish to avoid deficiency penalties and PAI exposure should acquire replacement capacity to cover their planned outages.

2. Errors due to any differences between the model used to determine ELCC and the actual cleared generation mix undermine the benefits of marginal ELCC. Dynamically determine ELCC values as auction clears.	

Key Work Activity 6 – Obligations of Capacity Resources

Determine the desired obligations of capacity resources.

Option 1
Identical to KWA 4
Requirements for Option
Identical to KWA 4

Key Work Activity 7 – Enhancements to the Capacity Procurement Process

Determine if there are needed enhancements to the capacity procurement process.

Component 1	Component 2
Evaluate shortening the auction's forward period	Evaluate whether LSEs should be permitted to procure less than 100% of their share of the reliability requirement through the centralized capacity auctions, and instead to demonstrate compliance through bilateral contracts (e.g., partial FRR or enhanced self-supply options)
Requirements for Option	Requirements for Option
We think this is separable from other activities, though shortening the forward period could make ELCC determinations more accurate since the resource mix is more certain.	Potential interactions with ELCC determinations would need to be understood.

Seasonal Capacity Construct

Items related to a seasonal capacity market construct.

Option 1
Variations in seasonal supply, demand, risk, and transmission all argue for a seasonal market. Earlier materials by PJM and stakeholders show the potential for large savings from better risk allocation across seasons. PJM should evaluate the benefits and tradeoffs associated with a seasonal capacity market design.
Requirements for Option
Resources should not be able to schedule maintenance during shoulder seasons for free. Instead, planned outages should be reflected in capacity accreditation or resources should procure replacement capacity (KWA #5, Option 2). If there is no annual offer, there may need to be an uplift mechanism, but the use of uplift should be minimized. The option for resources to specify the minimum conditions needed for annual clearing may eliminate the need for an uplift mechanism.

Key Work Activity 9 – Supply-side Market Power Mitigation Rules

Determine if supply-side market power mitigation rules in the capacity market need to be enhanced.

Component 1	Component 2
Consider eliminating capacity market must-offer exception for storage and renewables.	Evaluate whether any changes to mitigation rules are needed to reflect modifications of Capacity Performance obligations identified through the RASTF. Recommend education on CPQR discussion to understand how bonus and penalty structure affects supply-side market power mitigation.
Requirements for Option	Requirements for Option
Penalty structure is reformed so weather risk for renewables and energy limits of storage do not create penalty risk.	